STANFORD UNIVERSITY
W.W. HANSEN EXPERIMENTAL PHYSICS LABORATORY
GRAVITY PROBE B, RELATIVITY GYROSCOPE EXPERIMENT
STANFORD, CALIFORNIA 94305-4085

(PTP) AFT ECU TEMPORARY INSTALLATION

GP-B PAYLOAD VERIFICATION TEST II OPERATIONS ORDER

P0850 Rev -
31 May, 2001

PREPARED _____   _____
　　　　　　　W. Bencze   Date

APPROVED _____   _____
　　　　　　　K. Pearce, Systems Test Engr.   Date

APPROVED _____   _____
　　　　　　　W. Bencze, Test Director   Date

APPROVED _____   _____
　　　　　　　D. Ross, Quality Assurance   Date

APPROVED _____   _____
　　　　　　　R. Brumley, Payload Technical Mgr.   Date

REVISION RECORD

REVISION	ECO	PAGES	DATE

1. SCOPE

This procedure provides authority to temporarily install the Aft ECU unit into the Fist-Ops lab to be used during Payload Verification II Phase B.

NOTE
Flight hardware; protect parts and assemblies to prevent magnetic contamination and physical damage.

2. REFERENCE DOCUMENTS

2.1.   Procedures

P0847   ECU GSE Checkout

2.2.   Drawings

8A00922-101   ECU Aft unit assembly drawing

8A02105   Payload Cable Interconnection Diagram

2.3.   FIGURES

Not applicable

2.4.   SUPPORTING DOCUMENTATION

GP-B Magnetic Control Plan, LMMS-5835031

GP-B (FIST) Preliminary Hazards Analysis, LMMS-F314446

GP-B (FIST) Safety Plan, LMMS- F314447

FIST Emergency Procedures SU/GP-B P0141

ECU GSE Equipment Test Procedure P0847

3. GENERAL REQUIREMENTS

3.1 Quality Assurance

Integration shall be conducted on a formal basis to approved and released procedures. The QA program office shall be notified of the start of this procedure. A Quality Assurance Representative, designated by D. Ross shall be present during the procedure and shall review any discrepancies noted and approve their disposition. Upon completion of this procedure, the QA Program Engineer, D. Ross or her designate, nominally R. Leese, will certify her concurrence that the effort was performed and accomplished in accordance with the prescribed instructions by signing and dating in the designated place(s) in this document. Discrepancies will be recorded in a D-log or as a DR per Quality Plan P0108.

3.2 Red-line Authority

Authority to red-line (make minor changes during execution) this procedure is given solely to the Test Director or his designate and shall be approved by the QA Representative. Additionally, approval by the Payload Technical Manager shall be required, if in the judgment of the Test Director or QA Representative, experiment functionality may be affected.

3.3 Personnel

The following personnel are qualified to perform this procedure:

- William Benzce
- Lo Van Ho
- Scott Smader
- Rick Bevan
- Other:_____QA approval_____

See section 3.1 for details on which Quality Assurance personnel are required to be notified and/or witness this procedure.

3.4 Safety
In case of any injuries obtain medical treatment at:

<p align="center">Stanford University Call 9-911</p>

4. CONFIGURATION REQUIREMENTS:

4.1   SMD mounted in SMD test stand with the work platforms and scaffolding attached.

5. HARDWARE REQUIREMENTS

The Dewar, ECU and accompanying build hardware are very delicate. Be sure to handle them with care so that they do not become damaged.

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<u>NOTE</u>
Take all necessary precautions not to let anything physically damage the ECU and Science Mission Dewar or particulate onto its surfaces.

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5.1   Hardware Required:

Qt. 1	8A00922-101 ECU Aft Assembly
Qt. 5	NAS1351N3 or equivalent, 10-32 SHCS, A-286, 1/2" long
Qt. 5	NAS620C10 or equivalent, #10 Flat Washer, CRES
Qt. 1	26245-301 ground strap.
Qt. 1	Torque wrench 10-120 in-lbs.
Qt. 1	Mili Ohm meter
Qt. 1	Lab cart with ECU mounting plate attached.
Qt. AR	Hand tools (Alan wrenches, screw drivers, etc.)

6. OPERATIONS:

Operator _____ .

Date Initiated_____ .

Time Initiated_____ .

7. NOTIFICATION

7.1 Safety Notification

Safety shall be notified 24 hours in advance prior to the start of any work performed. Record who was contacted, the date, and time below.

Contact: _____

Date and Time: _____

7.2 Quality Assurance Notification

The Test Director is to notify the Quality Engineer 24 hours in advance prior to the start of any work performed. Record who was contacted, the date, and time below.

Contact: _____

Date and Time: _____

7.3 Government Notification

Quality Engineer to notify Government Representative 24 hours in advance prior to the start of any work performed. Record who was contacted, the date, and time below.

Contact: _____

Date and Time: _____

8. INSTALLING THE ECU UNIT AND CABLES

8.1   Mounting the ECU Unit
<div align="center"><u>CAUTION</u></div>

The ECU Unit is ESD Sensitive. Use appropriate ESD protection when handling the unit or installing associated cables.

8.1.1   Locate cart with ECU mounting plate attach. Wipe off the plate and ECU mounting tabs with isopropyl alcohol.

8.1.2   Connect ground strap on cart to Dewar or top had ground point.

8.1.3   Lift the ECU unit onto on to plate; align with four mounting holes at the corners of the ECU box.

8.1.4   While one person is holding the ECU in place, the other person will attach the 4 each 10-32 x 0.5" long socket head cap screws and 4 each #10 flat washers. Make sure to place the rolled edge of the washer against the ECU so that the mounting tabs will not be marred. Tighten the screws hand tight.

8.1.5   Verify that there is one flat washer under each socket head cap screw.

8.1.6   After all the fasteners are installed on the ECU, torque the four 10-32 screws per 21 to 30 inch-pounds.

   Torque Wrench Asset Number _____
   Calibration Due Date _____
   Final Torque Value _____

8.1.7   Quality Assurance to witness torque.

   QA Witness _____

8.1.8   Verify that all screws were torqued and the ECU unit is correctly oriented.

8.1.9   After the ECU unit is installed, measure the electrical resistance between the ECU unit and the mounting plate. The resistance is to be less than 0.1 Ohms. Record the data below.

   Ohm Meter Asset Number _____
   Calibration Due Date _____
   ECU unit to mounting plate _____ Ω

8.1.10 Quality Assurance to witness measurement.

QA Witness _____

Approval of Section 8.1

Approved: _____   Date: _____
                 Integration Engineer

Discrepancies if any:

Approved: _____   Date: _____
                 QA Representative

Approved: _____   Date: _____
                 Integration Manager

8.2.1   Installing Cables to the ECU Unit.

<div align="center">

CAUTION
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The ECU Unit is ESD Sensitive. Use appropriate ESD protection when handling the unit or installing associated cables.

8.2.1   Once the ECU is installed on the mounting plate, install the ECU Fwd to Aft cables per 8A02105. Prior to installing each cable, inspect the cable's connectors and mating connectors for bent or misaligned pins or sockets. If any contacts are discrepant, do not install the cable and notify Quality Assurance in order to document the discrepancy

8.2.2   ONLY LMCO personnel shall connect flight cables to flight hardware.

8.2.3   Verify that P0847 has been run on the ECU Power/HLD GSE.

8.2.4   Prior to connection of GRE to ECU, confirm proper pinout and function of GSE with ECU RE or designee. (See P0847).

ECU RE: _____

QA witness:_____

8.2.5   Ensure GSE is shut down (no power on connectors).

8.2.6   Connect GSE Power J12 to ECU J12.

8.2.7   Connect GSE Power J13 to ECU J13.

8.2.8   Connect GSE Power J27 to ECU J27.

8.2.9   Connect GSE 1553 A to ECU ACU J19 (1553 A Primary)

8.2.10 Connect GSE timing cable between SRE and ECU J23 (this step omitted if SRE is not available)

8.2.11 Verify that all the cables are installed in their proper locations and their fasteners are hand tight.

Approval of Section 8.2

Approved: _____   Date: _____
                    Integration Engineer

Discrepancies if any:

Approved: _____   Date: _____
                     QA Representative

Approved: _____   Date: _____
                    Integration Manager

9. PROCEDURE COMPLETED

The results obtained in the performance of this procedure are acceptable:

Test Engineer   _____   Date _____

PTD   _____   Date _____

Discrepancies if any:

The information obtained under this assembly and test procedure is as represented and the documentation is complete and correct:

Integration Manager _____   Date _____

QA Representative   _____   Date _____

Quality Assurance Manager _____   Date _____